ENVIRONMENTAL ASSESSMENT

AND FINDING OF NO SIGNIFICANT IMPACT ON

AMENDMENTS OF 10 CFR PART 20, SECTIONS 20.1003 AND 20.1201

REVISION OF SKIN DOSE LIMIT

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I. The Action

The Nuclear Regulatory Commission (NRC) is amending its regulations to revise its definition of Shallow-dose Equivalent (SDE) by removing the provision to average the dose over 1 square centimeter. In addition, the final rule amends § 20.1202(c) to specify that the assigned SDE must be the dose averaged over the contiguous 10 square centimeters of skin receiving the highest exposure. The intent of this rulemaking is to address skin and extremity doses from all source geometries under a single occupational limit. This change would permit measuring SDEs from discrete radioactive particles (DRPs) on or off the skin, from very small areas (< 1.0 square centimeter) of skin contamination, and from any other source of SDE by averaging the measured or calculated dose over the most highly exposed 10 square centimeters for comparison to the skin dose limit of 50 rem (0.5 Sv).

By changing the area over which the dose must be averaged, the amendment focuses on methods of determining dose to the skin and to the extremities. In some skin dose geometries the changes would result in permitting licensees to average a measured or calculated dose to a very small area, over 10 square centimeters. This, in effect, would raise the limit on SDE to the skin by a factor of as much as 10. For exposed skin areas of about 2 cm^2, the current dose limit would be raised by a factor of 5. For exposed areas of 10 cm^2 or more, the current limit is, in effect, retained. Although this change is expected to permit a reduction in the overly conservative use of protective equipment to prevent skin

contamination, no impact is expected on any entity or area outside of licensed facilities. Occupational exposure to workers on site is expected to be reduced.

This environmental assessment was publicly available during the 75-day public comment period for the proposed rule, and was provided to all Agreement and Non-Agreement States. No comments were received on the environmental assessment.

II. Need for the Rulemaking Action

In the mid-1980s, nuclear power plants began to detect the presence of discrete radioactive particles (DRPs) or hot particles on the skin and clothing of workers. Until the NRC staff established a broad technical basis to support a rule, using National Council on Radiation Protection and Measurements (NCRP) recommendations in Report No. 106, "Limit for Exposure to 'Hot Particles' on the Skin" (1989), the NRC issued Information Notice (IN) No. 90-48, "Enforcement Policy for Hot Particle Exposures." This IN announced a Commission-approved enforcement discretion policy that addressed reporting and mitigation if licensees experienced DRP doses in excess of the current skin dose limit of 50 rem averaged over 1 square centimeter, and enforcement action if the DRP beta emission exceeded the NCRP guideline of 75 μCi-hrs. To avoid the need to report DRP doses in excess of the current limit, licensees are monitoring workers frequently during work shifts, thus incurring additional external dose and stochastic risk. NRC-funded research at Brookhaven National Laboratory (BNL) and numerous published research reports demonstrated that DRP doses resulted in observable but transient breaks in the skin that are of little health consequence. The NRC then funded the NCRP to make recommendations regarding appropriate skin dose limits. The NCRP, in Report No. 130, "Biological Effects and Exposures Limits for 'Hot Particles'" (1999), recommended a limit of 50 rem (0.5 Sv) of SDE averaged over the most highly exposed 10 square centimeters for DRPs on or near the skin, and later recommended that this limit would be acceptable for all doses to the skin.

A related problem occurred when several incidents at a radiopharmaceutical licensee resulted in small (< 1 square centimeter) area contaminations that exceeded the current SDE limit of 50 rem averaged over 1 square centimeter. Although these events resulted in no observable or significant deterministic health effects, citations had to be issued and workers were restricted from continuing work in radiation areas for the remainder of the year.

The intent of the rulemaking is to codify the NCRP recommendations; to reduce significantly the external whole body dose, and associated stochastic risk that results from monitoring for DRPs; to address all skin and extremity doses under one limit; and to de-emphasize the need to protect workers from skin contaminations by the use of protective clothing and other devices that increase the workers' risks from unnecessary whole body dose and non-radiological hazards such as heat stress. The rulemaking also withdraws the interim policy in Information Notice No. 90-48.

III. Alternatives Considered

The following alternatives have been considered.

Alternative 1: No Action

Taking no action would save NRC staff resources and would preclude the need for licensees to revise worker training programs and radiation protection procedures. However, no action would continue the need for licensees to monitor workers while in radiation and high radiation areas for DRP contamination that results in unneeded whole-body dose, and would leave the interim IN on enforcement policy in place. No action would also result in licensees continuing the unduly burdensome practice of requiring excessive protective clothing and other equipment to avoid skin contamination, when in fact the protective equipment may expose workers to more significant hazards than are being avoided. The no-action alternative would have no impact on the environment other than to continue exposing monitoring technicians and workers to unnecessary external dose and industrial stress.

Alternative 2: Separate DRP Dose Limit

Establishing a separate dose limit for DRPs on or near the skin of 50 rem averaged over 10 square centimeters would be a relatively straightforward effort that would provide relief from the need to monitor workers for DRP contamination and thus from the unnecessary additional external dose associated with that monitoring. The interim guidance provided in IN 90-48 could also be withdrawn. However, this approach would not resolve the occasional small area, non-DRP contamination incident that, although causing no significant health effect, must be treated as an overexposure, and might restrict workers from continuing their employment in radiation areas. Because this approach would not permit averaging SDEs to small areas from concentrated radioactive liquids over 10 square centimeters, licensees would not have an incentive to move in the direction of reduced use of protective clothing to protect against insignificant skin contamination and overexposed workers might be removed from working in radiation areas even though no serious health effects were incurred. Thus the current situation of exposing workers to non-radiological hazards such as heat stress, and the additional whole body dose incurred due to less efficient working conditions, would continue. Finally the NRC staff is not aware of a justification for not complying with the NCRP recommendation to apply the 10 square centimeter averaging concept to all skin dose situations.

The only alternative that would accomplish all of the stated objectives is to propose a single skin dose limit as recommended by the NCRP.

IV. Environmental Impacts of the Action and Alternatives

The environmental impacts of the preferred action, as well as the environmental impacts of the alternatives, are considered by the NRC staff to be negligible.

The amendment is focused entirely on technical and procedural methods of determining the occupational SDE to the skin and extremities in the work place. No change is contemplated in any of the required procedures that monitor for or prevent the release of radioactive material either through effluents or possible worker contamination. All of the impacts associated with

this rulemaking are worker-related, and onsite, with no effect on any place or entities outside of a licensed site. The net effect of this rulemaking is expected to be a decrease in the occupational whole-body dose to workers that results from monitoring for DRP contamination, and a reduction in the use of protective equipment that exposes workers to known non-radiological hazards. It is expected that there would be no change in radiation dose to any member of the public as a result of the revised regulation.

V. Finding of No Significant Environmental Impact

The NRC has determined under the National Environmental Policy Act of 1969, as amended, and the Commission's regulations in Subpart A of 10 CFR Part 51, that the amendments if adopted would not be a major Federal action significantly affecting the quality of the human environment and, therefore, an environmental impact statement is not required.

The Commission believes that these amendments result in benefits to workers, flexibility to licensees and would continue to adequately protect public health and safety. There will be no change in radiation exposure to the public or to the environment due to the changes made by the final rule.

VI. List of Agencies and Persons Consulted

Much of the technical information required for this rulemaking was obtained directly from technical experts both within and outside the NRC. The technical basis of health effects information, derives primarily from work performed at Brookhaven National Laboratory that was widely peer reviewed. Recommendations from the National Council on Radiation Protection and Measurements were endorsed and adopted by this rulemaking. Copies of the Environmental Assessment were provided to all Agreement and Non-Agreement States and no comments were received.